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Spring Training– For Pilots

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BRIEFS

WETTING YOUR WICKER. For most aircraft with wooden components, preventive maintenance consists of keeping the moisture out. There is, of course, an exception to the rule: balloon baskets. The wicker or rattan fibers used in traditional balloon gondolas are very strong for their weight, but they may become brittle and nonsupportive if they are stored lengthily in a warm, dry environment—virtually any room that is heated without humidification. Wicker is susceptible to "dehumidification" or drying out because the natural skin is removed when the basket is dyed. Moisture can be restored by activating a humidifier within the basket and wrapping the latter in a plastic covering. Do this only when the propane tanks and any water damageable equipment are stored separately.

HIGH FLYING OBSTACLE. On the subject of balloons, airman vacationers in the Florida Keys should steer clear of a tethered balloon at 14,000' in Restricted Area 2916, 14 miles northeast of Key West International Airport. The cable is strobe lighted but the balloon is otherwise unmarked. (Restricted areas are special use airspace that can be penetrated only with authorization from the using or controlling agency.)

TWO FOR ONE. On March 3 the new consolidated flight service station opened at Bridgeport, CT. Be aware that the ultramodern station has assumed the responsibilities of the now-decommissioned Boston and Windsor Locks (CT) FSS's. This includes the Enroute Flight Advisory Service (Flight Watch) formerly provided from Boston.

STOPPED THIEVES. The International Aviation Theft Bureau reports a reduction in aircraft thievery. In 1983 181 aircraft were stolen, but about one out of every three was recovered. Over the previous decade thefts had averaged over 200 per year. The improvement has been attributed to greater security awareness by owners and stepped-up drug surveillance. The disappointing news was that avionics thefts rose 20%—nearly $20 million worth in 1983. Be alert to the presence of unauthorized persons in the airport operations area. Report any theft of aircraft or avionics (along with registration and serial numbers) to local police or the FBI. This information then goes into the National Crime Information Center computer to assure FAA and nationwise police awareness of the loss.

Immersion Hypothermia

Some apparently drowned ditching victims may be revived with appropriate care

The term "hypothermia" is usually thought of in terms of Arctic blasts and snowy winter landscapes—a life-threatening condition in every sense of the word. Oddly enough, hypothermia can also be a lifesaving condition, when it affects persons who suffer a prolonged submersion in cold water, such as might result from an aircraft ditching at sea or in a large lake. Recent insights and research have convinced medical specialists that hypothermia makes it possible, under some conditions, for a person to be revived without subseqeuent physical impairment after having been under water continuously for more than half an hour—provided that the condition is recognized and appropriate treatment is given immediately.

Hypothermia means that the body's inner or core temperature has begun to descend significantly below the usual norm (98.6°). It has long been known that a drop in the core temperature of only three or four degrees could overload the heart, impair the circulation of blood to vital organs, and lead to irreversible damage, notably to brain cells.

However, hypothermia is now believed to take place in an ordered, protective manner in many individuals (particularly those who are in good health and relatively young). The flow of blood to the extremities (hands, feet) and the skin in general is more or less completely shut down, in order to minimize loss of heat to the environment. Although this type of "thermo-regulation" increases the likelihood of frostbite injury, in below freezing temperatures, it is nevertheless a *life protective mechanism* because it enables persons to survive severe cold exposure over long periods of time without damage to vital organs. Apparently these are sustained through a severe reduction in the body metabolism rate, and a conserving of heat, oxygen, and other vital nutrients within the inner core. ("Induced" hypothermia is sometimes used in heart surgery.)

It is not known how long any given individual may be able to sustain life in these circumstances, or how severe a heat loss may be tolerated, but the toleration range is evidently much greater than previously believed possible. Persons whose core temperature fell more than 25°F below normal have been successfuly resuscitated, according to reports prepared by the U.S. Army Research Institute of Environmental Medicine.

"Immersion hypothermia" is a related condition. Fully documented cases are on record for persons who have been submerged in cold lake water for as long as 38 minutes, and have been retrieved, treated properly, and who survived without impairment to any vital functions. (A so-called " diving reflex," among its other consequences, blocks the entry of water into the lung passages of these survivors.)

The exact nature of the hypothermia process is not fully understood. However, enough is known about it to provide rescue teams with guidelines on how to handle victims of prolonged cold exposure. These include:

1. Cold and stiff does not mean dead. Make no assumption based only on appearance, touch, or absence of a discernible pulse or breath movement. In deep hypothermia it is not always possible to make an onsite determination as to whether a victim is still alive. Life may be present despite all indications of *rigor mortis*, including fixed eye pupils. Administer appropriate first aid (see following) and continue until qualified medical help is at hand.

2. Do not warm the victim externally (as by immersion in warm water or by applying heat directly to the body). Cover exposed skin with a blanket and provide shelter, but avoid abrupt temperature changes in the immediate environment. Transport victim to a medical center as soon as possible.

CAUTION: Improper handling of a person in a hypothermic condition may be injurious or fatal. Premature warming of the external body may permit the too-early flow of oxygen poor blood to the heart and brain, and upset the precarious conditions under which life has been sustained. Medical specialists are not in agreement about the administration of CPR (Cardio/Pulmonary Resuscitation) for hypothermia, owing to the weakened condition of the heart. If CPR is initiated, it should be continued non-stop until a physician arrives. The mouth and throat passages would be cleared, in any event, and any fluid that may have passed into the lungs should be pumped out.

Incidentally, the time-honored belief in the value of alcoholic spirits in restoring body heat is entirely misplaced. Imbibed alcohol has the immediate effect of stepping up peripheral circulation of the blood—which is exactly what the body defense system is trying to prevent, since it allows body heat to be drained away readily. If the victim is conscious and able to swallow, the best naturally available medicine is heated water, which will warm the body from the core outward, without overstraining the heart.

Since water is an extremely rapid conductor of heat, immersion in any body of water that is cooler than core temperature is theoretically capable of bringing about a hypothermic condition. This does not mean that lives should be risked exhaustively in the search for persons who disappear under water after a ditching. It does mean that hope should not be abandoned for victims submerged for prolonged periods of time. ■

Editor's note: Material on hypothermia was provided with the assistance of FAA's Charleston, WV Flight Standards District Office, the Federal Air Surgeon's Office, and Dr. Sidney Jackson, Clarksburg, WV.

Fuel Tanks as Water Traps

Why fuel sampling is not always complete protection

In spring a young pilot's fancy is apt to turn to almost any subject under the sun, but one item that is likely to escape his attention is the condition of his airplane's bladders. This is unfortunate, because many bladder type fuel tanks—which have been installed in some 70,000 U.S. built aircraft—tend to collect water which may *not be removable by ordinary drainage of the sumps during preflight.* If the accumulation of water in the tanks is significant—which is most likely to be the case with aircraft that have been parked outside unused over the winter season—the first flight of the year could end in engine failure and tragedy.

"Bladder" tanks, made of synthetic rubber or nylon, are flexible fuel containers installed in wing cavities, supported by structural framework. They came into common use in general aviation aircraft shortly after World War II, offering many advantages over rigid metal tanks. There is some saving in weight, of course, but the principal gain lies in the flexibility of the bladder, which is much less likely to spring a leak as a result of wing vibration in flight, or severe ground impact. Also, these tanks can expand or contract with the expansion or contraction of fuel during rapid changes in altitude, and therefore are less susceptible to rupture from stresses caused by pressure. Finally, in contrast to the high replacement cost of metal tanks (which are usually built in as an integral part of the wing), bladder cells are removable and replaceable at moderate cost.

These bladder-type tanks are likely to be found in a great many light aircraft built between 1945 and 1980, especially in medium-to-high performance single engine aircraft and all types of twins, including some jets. (Simple trainers usually do not have flexible tanks.)

As leak resistant containers, these bladder tanks have served aviation very well. However, in recent years FAA and the National Transportation Safety Board have found a correlation between water-in-the-fuel accidents and bladder equipped aircraft.

A review of the Safety Board's accident files for the six year period 1975 to 1981 disclosed that there were 396 engine failure or malfunction accidents in U.S. general aviation aircraft for which water in the fuel was cited as a cause/factor. The result: 72 fatalities, with serious injuries to 93 persons and minor injuries to 123 occupants.

The engine stoppage most frequently took place in the takeoff or climbout phase of flight. The great majority of the airplanes were single-engine Pipers and Cessnas, which is not surprising considering their popularity and widespread use. The Pipers were primarily older airplanes such as Models J-3, PA-12, PA-18 and PA-22. These all had *metal* tanks but, perhaps significantly, most did not have the convenient quick-drain devices that promote regular fuel sampling before a flight.

Most of the Cessnas were high wing airplanes, both old and new, particularly Models C-180, C-182, C-185, C-206 and C-207. All have rubberized fuel tanks. Cessna high wing primary trainers, like the C-150, C-152 and C-172, which are very numerous but which have metal tanks, were proportionally *under*-represented.

FAA determined that the heavy involvement of bladder-equipped airplanes was due to *wrinkles* or *folds* which sometimes develop in the flexible material, notably on the bottom of the tank. In some cases, depending on chance configuration, this wrinkling traps or isolates fluid at the bottom of the tank, preventing normal drainage to the sump. Water, being heavier than gasoline or kerosene, tends to settle at the bottom of the tank. If it is prevented from flowing to the sump drain,

FUEL CAPS

Ineffective sealing of fuel caps is believed by some experts to be a serious cause of fuel contamination by water, as well as a cause of some inflight fuel siphoning and fuel exhaustion accidents. Some types of plastic caps in particular are known to deteriorate and become brittle or misshapen as a result of continuous exposure to sun and heat. Flush-mounted filler pipes provide a well that retains water or other forms of moisture for long periods, leading to rust formation on the pipe and on the threads of metal caps. Any cap which has to be forcibly freed from the pipe is not going to seal properly again. Fuel cap inspection is an essential item on the spring preflight.

no amount of dedicated fuel sampling of these disfigured tanks will reveal its presence. In fact, if any water is detected and sample draining is continued until the sample is clear, the result could be a false sense of security—if any water is still trapped within the rubber folds. On takeoff, with changes in aircraft attitudes, water might be drawn into the engine with the fuel, causing engine roughness, malfunction, or stoppage at a critical point in flight.

Of the roughly 40,000 U.S. built Cessna aircraft which are equipped with bladder tanks, FAA estimates that about half may have developed this potential hazard. Deformation can take place during installation or during flight if the air pressure inside the tank is reduced to a value lower than the pressure outside the tank.

An accident of this nature took place last year at Weyer's Cave in the Shenandoah Valley of Virginia. The aircraft involved, a Cessna 182-L, had not been flown for several months, but an annual inspection had recently been completed at Shenandoah Airport, in preparation for a vacation flight to Trinidad. According to the report filed by the National Transportation Safety Board, during the course of the annual ". . . some water was found in the tanks, requiring drainage of about two gallons." Following this inspection the engine was started and run on the ground, but no flight test was carried out.

The scheduled departure from Shenandoah Airport was at 2:00 p.m. on February 3, 1983. During the preflight inspection that afternoon, a considerable quantity of water again was observed in the sample drained from the left wing tank. The mechanic who had performed the annual inspection was called over to look at the aircraft. According to the report, he proceeded to drain "between five and ten gallons" of fuel from the tank before the sample cleared. No water was found in the right tank.

The owner/pilot became aware during the preflight that the left tank filler cap needed a new seal. As none was available locally, he taped the cap in place and planned to replace it during a stop at Roanoke, VA, less than an hour away.

On takeoff the owner/pilot sat in the left front seat but the aircraft was flown by an instructor/pilot sitting in the right front seat. The owner's wife and child sat in the rear. Witnesses at the airport heard the engine first lose power when the *Skylane* was approximately 100-200 feet in the air. Power was apparently regained momentarily, then lost again. The pilot banked to the left and attempted a forced landing onto rolling farmland. Initial impact was made with the nose gear which collapsed. The aircraft careened down a slope into a creek bed near the hamlet of Weyer's Cave. The pilot in the right seat was thrown out and landed in the creek, where he drowned. The other three occupants were injured, the owner seriously.

Because of the complete immersion of the aircraft and engine in the creek it was not possible to determine accurately the extent to which water in the fuel played a part in this unfortunate accident. No evidence of any other cause of engine failure was discovered. When the rubber bladder tanks were removed from the wings, ridges and "dams" were found throughout their lower surfaces which, in the opinion of Safety Board investigators, could have impeded the flow of water to the drain points.

In a subsequent test conducted by the Safety Board on a standard Cessna Model C-182P, 32 ounces of water were placed in an essentially full left-wing bladder fuel cell. After allowing time for the water to settle down through the fuel, fuel samples were taken from the tank's quick-drain at the sump, such as might be taken by the pilot during a normal preflight procedure, with the airplane in a level position. There was no indication of water.

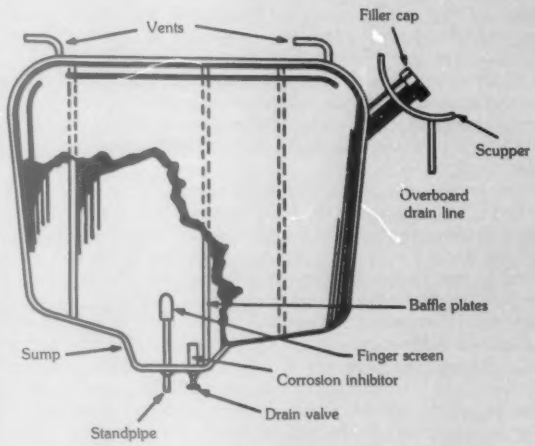
The wings of the airplane were then agitated and the tail was lowered and held to the ground carefully in accordance with Cessna owner Advisory SE 82-36A, to provide more advantageous drainage. (The sump is located aft and inboard of the wing tank.) After two more quarts of fuel were drained, five ounces of water appeared.

With the tail held down and the left wing jacked up, continued sampling produced an additional 10 to 12 ounces of water. The then remaining pint of water could not be drained out despite repeated attempts to do so. Removal of this water required complete drainage of the entire system and hand swabbing of the cell. Significant wrinkling of the cell was observed during the cleanout.

To determine whether these test results were typical of the drainage of rubberized fuel cells, the Safety Board had a second test performed on a Cessna Model C-182Q, at the Illinois Institute of Aviation, on February 9, 1983. A gallon of red-dyed water was placed in the airplane's essentially full right-wing bladder fuel cell and allowed to settle. With the airplane in a level position, the contents of the right-wing bladder cell were drained into a large calibrated Pyrex container. About a half gallon of water drained immediately. A separate sample of about three-quarters of a gallon of fuel was then drained from a low point near the fuel selector, but only a few ounces of water were produced. The tail of the airplane was then held to the ground while draining continued. About a quart of water came out immediately. Jacking up the right wing produced some additional water, but the total contaminant collected by whatever drainage means possible was only about three (of the original four) quarts.

When the fuel cell cover plate was removed, it was possible to see ridges and wrinkles through the cell, together with beads of water and small isolated puddles. In the aft, inboard corner of the cell, in the area of the fuel sump and strainer, a ridge extended from the aft (trailing)

Typical Light Plane Fuel Cell



Once is not enough. Continue until no trace of water appears.

edge of the wing cell to the inboard side, at a 45 degree angle. This ridge blocked considerable fluid from reaching the sump.

Another recent water-in-fuel accident in Virginia provided even more convincing proof of the potential hazard with bladder type tanks. The owner of a *Stationaire* (C 206) was returning to his home base at Norfolk after a flight to Charlottesville. According to the National Transportation Safety Board report, he had taken on 41.7 gallons of fuel at Charlottesville and there was no indication of any problem with the aircraft on takeoff or climbout. But the pilot's logbook recorded recent problems with a rough running engine, which he had ascribed to frozen fuel lines. On the flight back to Norfolk once again he experienced engine roughness near Richmond. According to his wife's statement to the Board, he took some remedial action which appeared to restore the engine to normal functioning. But on the descent into Norfolk, after the pilot was cleared for a visual approach to Runway 14, the engine again ran rough and then quit altogether on short final. The pilot was unable to clear a lake edge and impacted into trees. There was no fire, but all four occupants of the aircraft were hospitalized in serious condition.

On-site investigation of the wreckage revealed that there was adequate fuel in both tanks and the fuel selector was in the "On" position for the right wing tank. There were no obstructions found in the fuel system but water was found in the main lines and in the fuel strainer. The engine was removed from the airplane and bench tested. The engine fired up immediately and operated normally.

The wing was removed and sections were cut out of the top so that the top of the bladders could be slit open. Running along the bottom of the fuel cell were numerous ridges and walls, formed by bunching up of the bladder, and resulting in pockets where liquid could be retained and prevented from reaching the sump. One and three-quarters gallons of water were poured into the bladder before the water over came the resistance of these pockets and flowed to the main drainage point.

Since 1979 most general aviation aircraft have been built with metal tanks, not only because of the recognized potential hazard of trapping water in flexible material but also because the contemporary technology made available sealing materials which could be used to coat metal tanks so that they would not develop leaks from vibration. The major exception is the float plane, because of the intense buffeting its wing is subjected to during water landings and takeoffs.

However, many thousands of aircraft are still in use with bladder tanks. *How are pilots of such aircraft expected to guard against the possibility of trapped water?* Is preflight fuel sampling a wasted effort?

Not at all. Nothing said in this article should be taken as to suggest that the long established and proven practice of sampling the fuel for water at all the sumps before flying should be discontinued if the aircraft has bladder tanks. There is at least an even chance that the bladder bottom is not wrinkled in such a manner as to trap water—in which case sump sampling will test accurately.

If there is a problem with drainage from the bladders, irregularities in preflight sump testing might alert the knowledgeable pilot to any possible hazard. For example, if his preflight testing consistently shows no water in the sample—even after periods of long dis-use, or in conditions of high humidity—when other pilots in the area are regularly finding traces of water, *that* could be suspicious. Water vapor is always present in the atmosphere to some degree. Normally some condensation will take place in the tanks overnight, which should settle out on the tank bottom, and become evident when the sump is drained—if the drainage is unimpeded.

A precautionary procedure, recommended by FAA as a safeguard against water traps in bladder tanks consists of the following:

(1) Level the wings, lower tail gently (if tricycle gear equipped) and allow to stand for at least two hours.

(2) Take drain samples from all sumps, including gascolater and reservoir, until sample is clear. This should allow any water present to drain out, unless there is some blockage.

(3) Agitate the wings, then allow aircraft to sit for another two hours.

(4) Take drain samples again from all sumps. If more water appears, that is a strong indication there are hazardous wrinkles in the bladder.

(5) Have a qualified mechanic drain the entire fuel system dry, then remove the filler cap adapter for access to bladder cells, which should be swabbed out by hand and inspected for wrinkles. If the wrinkling appears hazardous, replacement is advised.

Pilots who operate certain Cessna aircraft equipped with bladder cells, Models 180 *Skywagon* through 210 *Centurion* (normally aspirated and turbocharged), should be aware of Cessna Service Information Letter SE84-4 which recommends a one-time inspection of the bladder fuel cells. Owners of these aircraft are also alerted to the announcement by Cessna on February 17, 1984, that a Service Kit to eliminate fuel cell wrinkles or folds is being developed by the manufacturer and is expected to be available by May 31, 1984. ■

Flight maneuvers can "spill" trapped water into engine intake.

Alternatives to Handpropping

"There ain't no such thing as a dead prop."

On an early Spring morning, when an unexpected late frost had left a tinsel of white over the airport ramp, the owner of a *Cherokee Arrow* had difficulty starting the engine. After some sluggish cranking he decided, rather than risk running down the battery completely, he would pull the prop over a few times to prime the engine and loosen the stiff oil. He adjusted the throttle to partially open, turned off the master switch and placed a chock under the nose wheel. He was under the impression he had turned the magneto switch off.

After the propeller had been pulled through several revolutions the engine kicked over and started up. The pilot barely managed to scramble out of harm's way as the aircraft moved ahead. He made a desperate effort to pull himself up onto the low wing so that he could enter the cockpit, but he was knocked off his feet as the *Arrow* picked up momentum. The unoccupied aircraft trundled across the ramp, struck the corner of a hangar, pivoted around the hangar and continued until it crashed through the ground floor window of an office building. The occupant of that office, who had just a few seconds before left his desk to draw a cup of coffee, turned around to see the runaway plane come to a halt partially on top of the desk. He was considerably disturbed.

A runaway airplane is a fearful hazard. In this case only the fact that the hour was quite early and few persons were on hand may have prevented the occurrence of serious injuries. The preliminary investigation indicated that the magneto switch had been left in the "on" position and that the handbrake was not set. The owner was an experienced pilot, holding a commercial certificate and a flight instructor rating.

Ironically, this is typical of handpropping accidents, which continue to take a grim toll of human life and limbs annually. In most cases the normal sequence or checklist of preparations for takeoff is interrupted by startup problems. Cold weather, which puts a heavy drain on the starter-motor and the battery, is often a factor. In his eagerness to get the propeller spinning, the pilot does not take the time to reverse all the actions he has already taken—in regard to setting the handbrake or turning off the magnetoes, for example. (Turning off the master switch does nothing to prevent the engine from starting if the magneto switch is on. As a matter of fact, anyone who handprops an engine, even if he makes certain to turn off the mags, should always anticipate the possibility that the propeller will kick over or back. Turning the switch to "off" normally grounds the magneto circuit, but a short in the wiring could leave it "hot." Any slight movement of the propeller could start the engine. Also, engine compression alone could cause the prop to kick back with hazardous effect.

There is one simple, certain means of reducing the handpropping hazard to zero: never do it. In reality, the occasions when handpropping is necessary (when the urgency is prompted by the need for life-saving activity) are extremely few in our day. In earlier times, before the era of efficient, battery-powered starter engines and convenient maintenance service, when pilots frequently had to go down in isolated country, with no radio or telephone contacts, handpropping was one of the accepted risks of flying.

But these pilots knew their powerplants intimately and respected them. Since handpropping was the rule in the simple aircraft of that day, every one was thoroughly schooled and practiced in the procedure of solo starting. Whenever possible one pilot was in the cockpit, "standing" on the brakes and monitoring the controls while the prop was pulled. Virtually all contemporary handpropping accidents take place with *no one* at the controls. Since the same person who spins the prop may have to release the restraints, he may be tempted to keep these to a minimum—just a nosewheel chock which in some high wing planes can be yanked free while in the cockpit. Convenient, yes, but not always enough to keep a strongly powered aircraft from jumping over the obstacle and setting out on a career of destruction. Some pilots who are well experienced in this kind of activity will tell you that initially they tie the airplane down so that even a hurricane will not budge it. After they get the engine started and warmed up to the point where it will idle slow and easy, they then progressively reduce the restraints to a single nosewheel obstruction that can be freed conveniently before departure.

Nowadays there are many alternatives to handpropping when your battery is weak. They may seem to be more time-consuming or inconvenient—or cost a bit—but they are much safer, especially for the pilot who is not used to it. The simplest and best solution is to have a fixed base operator at the airport provide you with power for your starter motor. If he charges you a few dollars, consider it life insurance well spent. If you intend to fly really early in the morning, after an inactive season, and are not sure about the battery, put it on a trickle charge the night before. Such chargers that plug into the AC outlet in your home are not expensive.

If battery failure in the airplane catches you by surprise, it is sometimes possible to jumpstart the engine from your car battery safely, using the same procedure you would use in jumpstarting the car: positive lead to positive, negative to negative or ground, and car engine running. (Make sure both batteries are of the same voltage. Since sophisticated avionics packages are placing a higher demand on aircraft electrical systems, some manufacturers of general aviation aircraft are stepping up from 12-volt systems to 24 or 28-volt batteries.)

However, this can only be done safely if you have convenient access to your airplane battery, and long enough cables. If you would have to open up the aircraft engine cowl to get at the battery, and close it again while the engine is running, don't even think about it.

Most light aircraft can have a small access door with a plug-in connection installed, as an option. You would require special aviation jumper cables that will clip on to your battery terminal posts at the other end.

In the long run, probably the greatest single influence that persuades a pilot to handprop his airplane, when strictly speaking it is not necessary, is his fear of losing his imaginary sense of identification with the Pilot as Hero—bold, daring, fearless, virtually indestructible. The truth is, it is not essential to be any of these things in order to be a really fine, skillful, respected and self-respected airman. If at heart you are anything else, carrying around a big "macho" image will not fool many people very long.

And it may get someone hurt. ■

WOODROT

Coping with the inevitable will cost you, one way or another

When you mention wood constructed aircraft many people immediately think of the pioneer days of aviation and antiques like the old Curtiss *Jenny*, but actually there are still hundreds of antique and other wooden aircraft being flown today. Contemporary designs using wooden structural parts are built by several manufacturers, and an increasing number of homebuilt aircraft employ wood to some degree.

Those who fly aircraft with wood components are convinced of its advantages over the use of metal in construction. Amateur workers say it is easier and more economical to work with and repair than metal. They note that wood is more pliable and can be more easily molded. They also point out that wood does not rust or corrode and apparently is not subject to *vibration fatigue*, which can limit the useful (safe) life of metal structures in an aircraft.

However, despite these advantages there is a unique problem which weakens the case for wood—wood can rot. If this happens and goes undetected, then during flight, particularly in turbulence, some critical structure of the airplane may snap. Such accidents are not common, but they are almost invariably fatal.

Example: A 21-year old wooden wing Bellanca 17-31ATC *Turbo Super Viking* had been operated for many years by a Massachusetts-based pollution research firm. On a clear but blustery afternoon in late October 1983, the company's ATP-rated pilot and an electronics observer took off in the venerable *Viking* from Bedford (northwest outskirts of Boston) for a calibration run for some new air sampling equipment that had recently been installed. The wind was from 220 at 15 knots, gusting to 23, and light to moderate turbulence had been reported. Just six miles from home base near a small town called Littleton, the *Super Viking* experienced what accident investigators described as a "catastrophic structural failure." At an altitude of 1,000' AGL in straight and level flight, the right wing separated from the fuselage. The *Viking* spun out of control and crashed. Both occupants were killed.

Preliminary investigation by the National Transportation Safety Board has shown that the failure occurred at the lower front wing spar attach fitting. The metal attach fitting remained in place on the fuselage; the rotted spar broke away because of decay around the bolts. It was believed that moisture had entered through the wing fairings, along the metal attach fitting, and had seeped into the fitting bolt holes.

Wood decay, or rot, is caused by a fungus, a form of plant life which feeds on and destroys the cellulose content and structure of wood fibers. The seed of a fungus plant is a microscopic airborne spore, present in almost all common environments. These spores will endure in a dormant stage for years, and spring into growth when the wood becomes damp, and the temperature will support vegetable life.

A germinating spore sends out minute hairlike strands, much like veins, which seek out the cellulose of the wood and absorb it for sustenance. These filaments break down the cell walls of the wood with a resultant loss of strength. As the fungus develops, the wood darkens because the microscopic hairs have become so numerous as to form visible masses. In an advanced stage, this fungus can even produce bore holes, caused by highly localized areas of fungus penetrating the walls of adjoining wood cells.

Incidentally, the term "dry rot" which is often used is actually a misnomer. There is no such thing as *dry* rot. There must be moisture for rot to develop in wood. The term "dry rot" seems to have originated far back in nautical history when sailors discovered powder in pieces of wood which were then dry because the whole rotting process had been completed.

Some aircraft, such as the *Aeronca*, use wood for the wing spars, ribs, and other structural material, but (as with ultralights) the skin which actually forms the airfoil consists of an upper and lower covering of fabric. This form of construction goes back literally all the way to the earliest Wright *Flyers*. In the earlier days of aviation the cloth used to make up this fabric (see "Worn Threads," in this issue), was made of flax or cotton and had to be replaced every few years. At this time it was possible to inspect all the internal wing wooden structural members for signs of decay, and to replace weakened components.

However, the development of longlasting synthetic fibers and protective coatings has lengthened the lifespan of fabric several fold; if the airplane is well hangared and maintained it may go as long as 10 or 15 years without a new covering job. The problem is that *it is unlikely the internal wood structure will remain rot-free for such a long period.* Unless the wing is removed at reasonable intervals, uncovered, and gone over thoroughly in a repair shop, decay may progress unnoticed to a hazardous degree—until a wing failure or separation occurs in flight. Annual inspections of the internal wooden parts are usually carried out via access holes, or by "non-destructive" testing methods that avoid the heavy expense of removing the wing, unless suspicious areas of decay are detected.

Other manufacturers, like Bellanca or Mooney, cover the wooden wing structure with plywood sheathing, on top of which a layer of fabric is glued down. It is a fairly simple matter to remove this fabric and examine the wood sheathing, but that may not guarantee the absence of decay in portions of the underlying spar, ribs, etc. Again, to some degree one may inspect through access ports, also by "sounding," probing, and by other approved methods, but unless the wing and all fittings are removed it is still possible for some areas of decay to remain undisclosed.

In the *Viking* accident described above, the Safety Board reported that wood rot developing at the inboard end of the spar may have escaped notice during annual inspections because it was hidden by the wing straps and the spar's forward face plate. This also precluded probe testing the area, unless the wing was removed.

There is a tragic history of such accidents with various wooden aircraft, often leading to wing separation and fatal consequences. FAA now requires (by Airworthiness Directive) that a very intensive inspection of the wooden wing structure, as directed by the manufacturer, be carried out at every annual or 100 hour inspection. On the outside,

mechanics are to look for swollen (water logged) areas and press with a blunt object to detect wood softness, an indicator of rot. As well, they are to check for cracks or porosity in the fabric doping or signs of delamination (bubbles, discoloration, etc.) that would allow moisture to seep inside the wing. Drain holes have to be checked for blockage.

Interior inspection of the wing includes not only removal of all access plates and covers but also, in some cases, tests must be conducted for the moisture content of the wood; wood surfaces must be probed carefully with a sharp instrument; and some small sections or "plugs" cut out of the covering material. Components that are weakened by decay or saturated with moisture have to be removed and replaced.

Wooden aircraft owners and operators should realize that such inspections are not only time-consuming but that they require a great deal of specialized knowledge and experience to be done properly. Since wooden aircraft make up only a very small proportion of the general aviation fleet, many FAA-qualified airframe mechanics have very little opportunity to work on them. Owners may find it worthwhile, when the annual is due, to ferry the airplane a considerable distance in order to find a shop that is really familiar with it. This is not going to be a cheap operation, but there is simply no way of economizing safely with a venerable wooden airplane.

In terms of owner or pilot preventive maintenance, there is a great deal that can be done to keep your wooden bird healthy and the "medical" costs down. A good maintenance specialist can steer you in the right direction, but the following suggestions are standard:

Hangaring. A wooden airplane should be stored in a hangar if at all possible, preferably a hangar that can be heated in damp weather. Veteran authorities on wooden aircraft, like Terry Dill of the Aircraft Owners and Pilots Association's Maintenance Department, will tell you that you are going to pay for a hangar one way or another—if not in rental fees then in additional maintenance costs. In most sections of the country it just is not possible to prevent moisture from working its way into the wood eventually.

Not too long ago an FAA maintenance inspector in Lancaster, CA was checking the flap bay area of a Mooney *Mark 20* by flexing the flap hinge brackets, when the bracket dropped off literally into his hands. An inspection revealed well developed wood rot which had apparently begun after moisture seeped in through several screw holes at the trailing edge of the wing. The owner of this aircraft was lucky—a takeoff run over rough ground might easily have resulted in flap separation during a critical point in the lift off. Note that Lancaster is located at the edge of the Mojave Desert, not exactly in an environment where you would expect problems with rot.

Note that a fully enclosed hangar is not necessary. In some areas there may be an advantage to having one that is open ended, so that it is well aired out. What is really important is that moisture absorption from the ground be sealed off, not only by means of a paved flooring but also with a vapor barrier under the paving.

Preflighting. Make it a habit to really take your time looking over the wing. Get to know it like your own face, so that the smallest blemish, tear, scratch, or discoloration will get your attention. Observe the hinges and fittings carefully as you move the wing and flaps. Look for streaks around the fairings that indicate signs of leakage. Do not neglect the underside. Know where every drain hole is, and check them with a suitable probe often. Realize how vulnerable your airplane is, on the ground, to pebbles and other debris thrown up by prop blasts. Protect it from hail, windstorms and nesting creatures.

Keep it clean. Dirt can hide problems you want to know about, and it also holds moisture. Cleaning the wing is a good way of getting familiar with every square inch of its surface. If you shine it up after every flight before you leave it, you will not lay awake at night imagining a horde of fungi chomping your plywood airfoil into pulp.

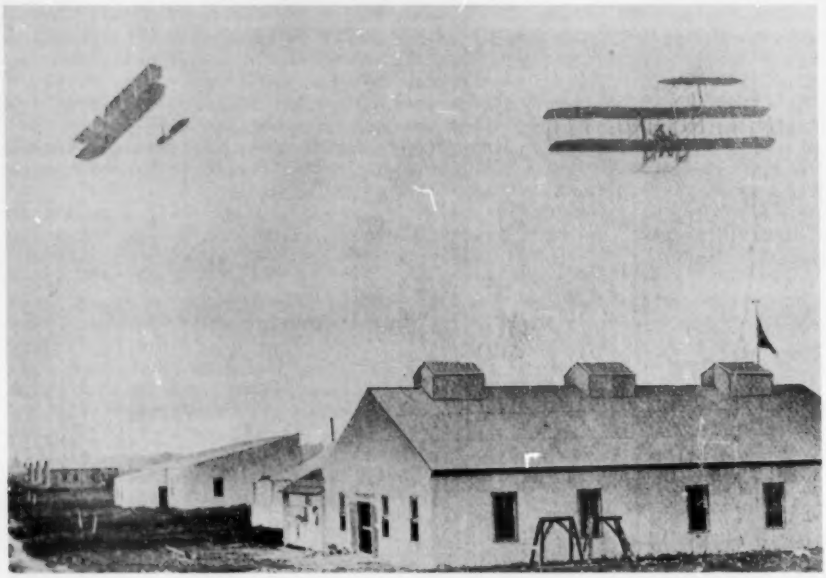
(continued on back cover)

Even with inboard fairing removed, inspection access to wing spar end is severely limited by adjoining structure.

Wing of a Stinson L-5 removed during inspection. Fabric peel-back revealed mildew (dark stains) and crumbling wood around aileron and flap.

College Park Airport Early Days

The cradle of aviation pioneers is alive and well in Maryland



History has a strange way of leaving its mark on contemporary scenes in a way that fascinates generations to come. Nearly 200 years after his death tourists still gaze in wonder on a bed that George Washington is said to have slept in. Memorable persons or events can endow a common room or shop or meeting place with an aura of greatness—a lasting reminder of marvelous things that took place in the land, and may occur again.

Such a place was College Park Airport, on the outskirts of the nation's capital, lately a diminutive relic of dimly remembered events but once a veritable Camelot for bold and idealistic airmen. The two and a half decades of its great age, 1909 to 1933, saw an incredible outpouring of imaginative ideas in a small aeronautical arena, to the enthusiastic applause of the local population and the national press.

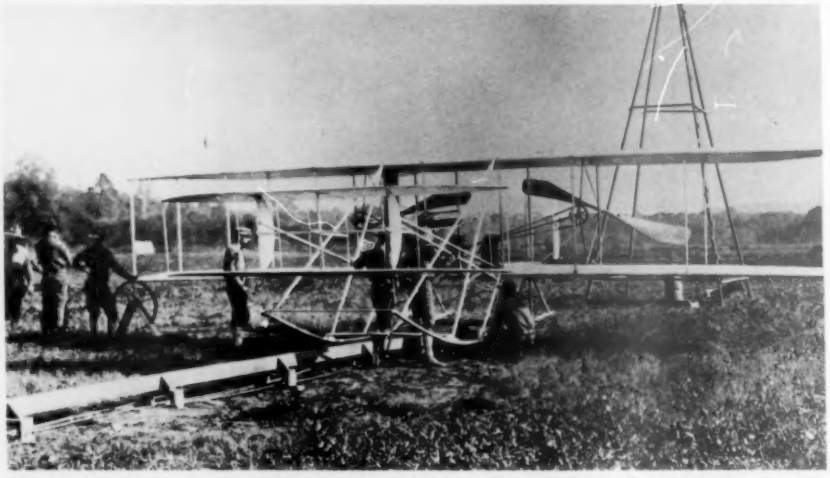
The airport came into existence in July of 1909, when the U.S. Signal Corps leased 160 acres of unused farmland located about 7 miles northeast of Washington, D.C., near the town of College Park, MD. The sparsely settled township, distinguished chiefly by the presence of the Maryland Agricultural College (now the University of Maryland), had caught the eye of Army balloonist Lt. Frank Lahm, who had been sent aloft in search of a remote, level site suitable for the Signal Corps' experiments with the Wright brothers latest flying machines. Relocation from Ft. Myers had been requested by the Commandant, who was tired of having army activities interfered with by hordes of curious onlookers from nearby Washington, whenever a flight was scheduled.

According to legend, Lt. Lahm landed in his balloon on an open field near College Park and borrowed a horse to scout the surroundings. Soon afterwards the Army began negotiations for a lease.

During the following month the land was cleared of trees, fences and other obstructions, a runway was designed and a hangar built—the first "air port" to be officially designed and designated as such. In October the first flight school was opened by the Wright brothers at College Park, as part of their contract to provide the Army with an aircraft that would carry two men (weighing up to 350 lbs.) at 40 mph and remain aloft for an hour; and to train two pilots to fly it. The training curricula was basically what flight training is today: ground school on the theory of flight, airframe controls and engine operations, followed by dual flight instruction until the trainee was considered competent. A Lt. Frederick Humphreys had the honor of being the first "graduate" of the school, soloing his Wright *Flyer* on October 26, 1909.

Although the College Park site was ideal in many ways, its distance proved no obstacle to local aviation enthusiasts and newspapermen, who made daily pilgrimages, by train, trolley, horseback or horseless carriage to the busy aviation scene. During the first month of operation there were usually only two flights a day, one in the early morning and another late in the afternoon, when the wind was light; but large crowds found it interesting to stand around for hours waiting for a glimpse of an airplane in flight.

On the morning of October 28, when the first woman flew in an airplane in the United States, excitement among the onlookers was especially keen. Many persons still felt that the upper air contained unknown and mysterious forces which the "more fragile sex" might not be able to withstand. The pilot, dour Wilbur Wright, took a dim view of carrying the female passenger, a Mrs. Ralph Van Deman, but the lady was a close friend of his sister, Katherine, who persuaded him to relent. Mrs. Van Deman, wore a very fashionable "walking dress" that had to be secured around the ankles and knees for modesty's sake when she took her place beside Wilbur.



First airport takeoff. Catapult rail launching Wright airplane at College Park on October 8, 1909.

She was ecstatic about the brief, four minute flight, exclaiming afterwards that, "Now I know why birds sing!" The crowd and the press corps loved her.

Military activity at College Park lapsed in 1910, but a growing collection of aviation minded civilians—aviators, inventors, mechanics, would-be pilots—stepped into the breach. Gathered around a hangar built at the edge of the field by patent attorney Rexford Smith, their days were filled with discussion, experimentation, ground and air trials—and ever more discussion. In January 1911, a group organized themselves formally as the National Aviation Company, the first recorded civilian flight and ground school with a half dozen assorted airplanes, including Wright *Flyers*, Curtiss *Pushers*, and a French *Bleriot*. For the first time the world of aviation was open to anyone who walked in off the street with a few dollars in his pocket and a willingness to learn.

Next month the Signal Corps returned, leased an additional 100 acres and stepped up

First woman airplane passenger in America, Mrs. Van Deman. Wilbur Wright at controls.

their flight training program. Aviation was still so young that much of what was learned came from accident or improvisation. The first night landing was made because a Captain DeForest Chandler flew his aeroplane to attend an Army-Navy football game and due to engine problems returned unexpectedly after sundown. (Strip-fires were built along the runway to help him get down.) Soon afterwards an effective system of landing lights was developed. The playful "bombing" of targets with potatoes led to the testing of a bomb dropping device. Accident injuries led to protective flying gear: football helmets, motorcycle goggles, leather jackets, and boots.

In the next year, 1912, the first use of hinged ailerons was reportedly developed at College Park (by Dr. William Christmas), and the first flight over one mile high was accomplished (Lt. "Hap" Arnold).

At the end of 1912 the Signal Corps' Aviation Division had outgrown College Park and abandoned their lease. Civilian use and experimentation continued, and in 1918 the Post Office began flying the mail from College Park to New York and other major cities. In 1924 the first controlled helicopter was built and flown here; also the first all-metal, smooth skin aircraft. In 1927 a nation-wide network of radio aids to navigation was first tested at College Park, where the first radio range station was established. In 1929 successful "blind landings" were being accomplished with equipment perfected by the U.S. Bureau of Standards.

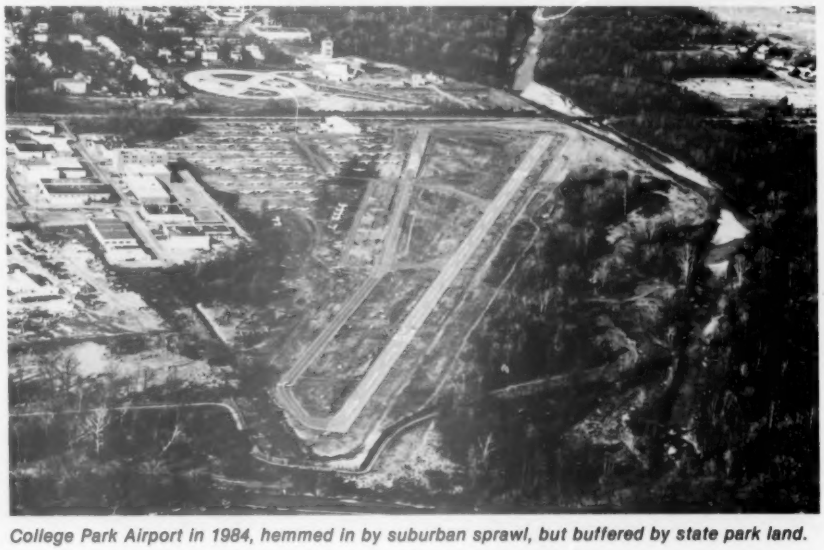
First controlled helicopter flight accomplished by Berliner in 1924—nine years before Sikorsky.

The ferment of aviation pioneering at College Park subsided during the Great Depression years of the 1930s, and never revived. Through economic encroachment the land area dwindled to a mere 40 acres, and with the Federal build-up of the Washington National and finally Dulles International airports nearby, commercial air traffic never materialized. The inventors and the dreamers grew old and went elsewhere, to retire in the sun. The buildings grew old and shabby, and the ramp and runway were pitted with potholes. Citizens complained of the hazard of low flying airplanes. By the mid-1960s, with flight activity almost nonexistent and real estate development pressing on several sides, the airport seemed about to disappear.

But a sudden ground swell of sentiment in favor of preserving this "living memory" of the early days of flight spurred county authorities into purchasing the land from its private owners (for $1.5 million). The Maryland-National Capital Park and Planning Commission now administers it, as both an active airport and an historical museum. The latter, designed by Catherine Wallace (M-NCPPC Park Historian), is expected to expand steadily.

The airport currently has about 75 aircraft based on the field and provides a complete maintenance facility as well as an avionics shop with computer flight instruction. The 2,740 foot runway is lighted 24 hours and operations average about 100 per day. Manager John Barney says there has been a recent increase in transient traffic among persons who wish to avoid the high landing fees and heavy congestion at the larger airports. A big surge in this trend is expected when the Metro (subway) reaches College Park.

The airport's annual air fair and open house, which this year commemorates 75 years of continuous operation at College Park and 200 years of aviation in Maryland, is expected to attract 50,000 visitors. A new "94th Aero Squadron" restaurant will be open to serve them. Better times apparently lie ahead, although the glory days are gone, and will not return.



College Park Airport in 1984, hemmed in by suburban sprawl, but buffered by state park land.

Worn Threads

For fabric coverings, sun damage heads the list of environmental destructive agents

The familiar adage about not being able to see the forest for the trees applies only too well to the maintenance of fabric-covered aircraft—and ultralights as well. The owner or operator who carries out a thorough, conscientious preflight checkup on his aircraft each spring usually gives his first attention to the engine. It is large, noisy and hard to overlook. Next in order may be the propeller, controls, landing gear, structural members, instruments and avionics. What is frequently ignored or forgotten is merely that component which holds the whole machine up in the air: the skin, or outer covering. And if that covering is fabric it is very sensitive to environmental degradation.

There are many thousands of fabric covered aircraft in active use today, and many more are still being produced, both by commercial manufacturers and by amateurs. The ultralight fleet, of course, is virtually all fabric covered. Lightweight cloth has obvious advantages over the more common aluminum skin, but in the name of safety it requires considerably more care and upkeep.

Fabric, consisting basically of woven threads, is one of the oldest of human inventions, going back to the dawn of civilization. For its weight it has remarkable tensile strength. The earliest aircraft were covered with very durable linen, made from the flax plant. Linen was succeeded by cotton, which is smoother, less wind resistant and more flexible. In more recent years cotton has been giving way to polyester synthetics, like Dacron, which are lighter in weight and are not attacked by the fungi that cause mildew.

No fabric suitable for aviation, however, has yet been invented which is impervious to one extremely common and potentially destructive element of the environment: the ultraviolet rays of sunlight. Under continuous exposure the ultraviolet portion of the spectrum will cause all types of threads (including synthetics) to shrivel and eventually lose their flexibility. This loss of integrity may take place without any obvious outward indications, so it may be overlooked by a pilot who is eagerly bent on taking to the air.

A situation of this kind was reported recently by the Experimental Aircraft Association's ultralight division. A young man purchased a "previously owned" ultralight from a dealer, a shiny looking vehicle with an unusual pinkish white covering. Before going aloft in it he took pains to study the theory of flight at a ground school operated by the dealer. He also received instruction in taxiing, "crow hopping," and in short, straight ahead flights. For his initial solo flight he was careful to select a morning with ideal ultralight meteorlogical conditions: no wind, no traffic, no clouds. He took off without difficulty and flew around the pattern, waving jauntily to family, friends and others on the ground. The fun ended when, in a shallow right turn, the right wing covering suddenly ripped apart. The ultralight spiraled down out of control and crashed in a heavy stand of woods. The young pilot was found in the wreckage with a broken leg and other injuries, including a coma which lasted two weeks.

Later, investigators discovered that the distinctive pinkish white color was the result of sun bleaching a fabric that had once been bright red. Discoloration is a sure sign of ultraviolet damage to fabric and an urgent signal that the fabric should be examined carefully and tested before any flying is done. The consensus of ultralight experts who looked into this accident was that there was nothing defective about the sailcloth used for the wing, but that it had failed as a result of "improper storage," i.e., *because the vehicle had been left tied down outside during non-use periods.*

Many persons tend to assume that synthetic cloth, which is often glossy and apparently impervious to weather, needs no protection from

the elements—that it "lasts forever." That is simply not true—at least as regards the kinds of fabrics used on ultralights and on aircraft. These progressively lose their tensile strength, at a rate which is proportional to the amount of ultraviolet radiation being received. (Ultraviolet rays are not diffused by clouds, but their intensity increases as one moves toward the equator.)

The fabric used on *conventional* aircraft, whether it be linen, cotton on polyester, or other, must meet certain standards for tensile strength, tearing strength and thread count. For example, the minimum tensile strength for new grade A mercurized cotton is 90 lbs. per sq. in. This material, following use, becomes non-airworthy after it deteriorates below 56 lbs.

For non-registered ultralight vehicles there are no established standards for fabric strength, and considerable variation exists within the industry as regards material selection and weight. In general you can expect that the lighter the fabric weight and the darker the color, the sooner it will be seriously weakened by sunlight.

Some of the newer fabrics for ultralights are pre-impregnated with ultraviolet blocking agents in the manufacturing process. However, such fabrics tend to be stiffer and heavier than the usual material, so the owner pays a price in terms of performance. There are also some new fabrics woven with acrylic fibers that are impervious to sunlight damage, but these too are quite a bit heavier than polyester or cotton, and they are very expensive.

In contrast to ultraviolet damage, which occurs in the presence of direct sunlight, mildew degration takes place on fabrics in damp conditions and in the absence of light. The fungi which cause mildew attack the cellulose in natural fibers. They do not attack synthetic fibers but they are able to form colonies on the surface of synthetic cloth, in conditions of dark and dampness, producing dark streaks on the cloth. Since dark colors increase the absorption of all light rays, this leads to an intensification of ultraviolet damage to the dark areas on the fabric. With fabric that is light colored except for dark numbers, or stripes, the cloth beneath the dark paint can be shown by tests to weaken much faster than the surrounding areas.

A third enemy of fabrics is what is popularly known as "acid rain." Near areas of heavy industrialization, sulphur dioxides released into the atmosphere combine with oxygen, sunlight, and moisture to form sulphuric acid, which is not only destructive to cotton and linen but also, in a lesser degree, to synthetics.

The owner of a fabric covered craft appears to be caught between a rock and several hard places. Hangaring (or using wing covers) protects against ultraviolet rays and sulphuric acid, but may encourage mildew. *What to do?*

Ultralight airfoils, despite synthetic fabric, are vulnerable to solar decay.

For fabric-covered aircraft that must be left outside, the best protection against ultraviolet rays or acid damage appears to lie in the application (by qualified mechanics) of an approved fabric coating, or "dope." For ultralight vehicles there are a number of commercially available coatings with or without UV blocks. The proper material will screen out harmful sun rays and make it easier for you to keep the fabric clean, which will reduce the likelihood of acid damage. ("Doping" of double covered wings is routinely required to protect the wing interior from dampness.) In time some cracks will appear in the coating, requiring reapplication, but it appears certain that the overall useful life of the cloth can be greatly lengthened with this form of protection. Fungi inhibitors may also be incorporated in the dope film, to resist mildew. Check with your dealer for best coatings, or ask at the nearest FAA Flight Standards District Office.

Caution: coatings that give you an attractive, glossy surface do not necessarily provide sun damage protection. Specify a coating with manufacturer-warranted protection.

The ideal hangar for fabric-covered aircraft is one that can be heated and has a paved floor. Bare ground exudes moisture which can condense on the wings and encourage mildew. Before the craft is brought to the hangar it should be cleaned thoroughly and dried, inside and out. Special care should be taken to leave no remnants of food in it that would encourage the entry of mice or other vermin. (In the course of a hard winter some wild creatures will chew on the fabric, or leave destructive acidic deposits on it. In a damp climate, use heat to dry out the building periodically, and try to air it out on windy, dry days. Fly the aircraft or ultralight as often as possible; there is no better way of airing out the fabric.

But before flying a "well rested" ultralight or fabric-covered aircraft, examine its skin very carefully not only with your eyes but also with your hands. Do not be afraid of poking holes with your fingers in the material. If you can do so, you certainly do not want to be flying that "bundle of rags." Pay special attention to areas that have resistant stains, or that have little tears or cracks. If you have any reason to be suspicious, have a mechanic (one who is not only technically qualified but who also works on fabric covered aircraft or ultralights frequently) check it over with the appropriate instrument.

This consists of a special punch tester with a color coded dial that, when matched up against a fabric pressure chart, will determine whether the material is still within the safety limits. Several small holes may be punched in the fabric in the course of testing, but the mechanic should be able to patch them in a manner that retains the integrity of the cloth.

Incidentally, small *accidental* tears in the fabric of ultralights may be repaired by the owner, using one of the commercial patch kits that are available at fixed base operators. The same is true of registered aircraft, unless, of course, rib stitching is involved. This requires the services of qualified airframe mechanics. Note that in order to complete patchwork satisfactorily, pressure must be applied from both sides of the mending areas, and this could require disassembly of the wing if it has a double fabric surface. It may not be necessary if the tear is small enough to be held firmly together by zigzag or "baseball" stitching.

There are some specialized and expensive materials on the market for washing aircraft and ultralight fabrics, but the basic trio of mild detergent, warm water, and a bristle brush are hard to beat—moneywise and otherwise. Regular scrub jobs will keep you informed about the condition of the fabric and presence of mildew stains or ultraviolet fading. A thorough rinse (water) is important, since residue chemicals may be harmful; it helps to have a hose available. Choose a day with warm, drying winds, and make certain all of the fabric is completely dry before you move the craft inside.

Like the human skin, all fabric coverings have a natural life cycle, which can be extended with intelligent care. Keeping it clean, resilient and "youthful" is a good way of protecting your health. ■

FROM CROP DUSTER TO FIRE FIGHTER. The latest weapon against forest fires is a former agplane, *Thrush Commander*. Noted for its speed and maneuverability, the newly christened *Sea Thrush* has been float-equipped and modified so that water can be pumped into its 400-gallon hopper during high-speed water taxiing. What makes it attractive is its ability to drop down on water sources too small for large planes and its fast turnaround time—10 seconds to replenish the water.

PROPOSED AIR TRAFFIC RULES FOR 1984 OLYMPICS

General aviation aircraft flying to Los Angeles and other sites of the 1984 Summer Olympic Games will be subject to certain air traffic requirements now being finalized by FAA. Current thinking is that beginning on July 14 and ending on August 26, advance reservations will be needed for IFR arrivals in southern California at LAX, BUR, LGB, ONT, and SNA, and for VFR arrivals at LAX (except for helicopters). Present indications are that a flight plan may also be required for unscheduled VFR arrivals of fixed-wing aircraft at LAX, but airborne filing of flight plans should not be allowed within the Los Angeles Olympic Area (airspace within an 80-mile radius of LAX). Pilots may be required to check NOTAMs prior to each flight into, out of, and within this airspace.

For U.S. scheduled air carrier and commercial operations at LAX, FAA is proposing an advance reservation system for arrivals which would provide up to 114 slots. Each operation would be limited to the number of arrivals granted under the current (interim) operating plan plus any additional slots that may be provided by the special Olympics rule and the re-opening of Runway 25L.

Twenty-six airspace restricted areas are proposed over the Olympic Villages and sites of the various events. The only flights permitted in these areas would be security, emergency, law enforcement, and FAA-authorized special routings to and from local airports.

The Olympic Reservation Service—with a special toll-free number—could begin operation on July 1. A full description with graphic aids will appear in the May/June issue of FAA GENERAL AVIATION NEWS.

AIRPORTS REGAIN IFR FLIGHTS

FAA has restored the IFR hourly operation capacity at LaGuardia, Denver, and O'Hare airports to pre-controller strike levels. (Under Part 93, Subpart K certain high density airports have their IFR operations per hour limited. Because of the 1980 strike, these levels were reduced.) Only Los Angeles International will maintain its reduced capacity until after the Summer Olympics Games.

NUCLEAR FLY-OVERS MAY BE BANNED

FAA is reviewing comments received on an advanced notice of proposed rulemaking that would establish special use airspace over nine nuclear weapons facilities. The proposal, designed as a security measure, would ban all helicopter flights over the areas, which would appear on charts as *prohibited* airspace. Fixed-wing aircraft would also be affected, but only if flying below the ceiling altitudes of the areas. Some existing federal airways and airport instrument approaches would be affected.

The proposed sites are:

CA — Livermore
San Francisco
CO — Golden
ID — Idaho Falls
NM — Los Alamos
SC — Aiken
TN — Oak Ridge
TX — Amarillo
WA — Richland

For further information contact B. Keith Potts, Airspace Rules and Aeronautical Information Division, Air Traffic Service, 800 Independence Ave., S.W., Washington, DC, 20591; (202) 426-3731.

LATEST AIRMAN PUBLICATIONS

Small Plane Emergency Exits

AC 23.807-3, "Emergency Exits Openable from Outside for Small Airplanes," provides guidance for owners in external marking and identification of emergency exits. This would enable rescuers to save time in opening exits in the event of an accident. Free from DOT Publications Branch, M-494.3, Washington, DC, 20590.

Explaining TCA's

Student pilots—or others who need some clarification—will be interested in AC 90-83, "Terminal Control Areas." This free publication (from above address) explains TCA's and answers the most frequently asked questions about this form of controlled airspace.

The Ultralight Vehicle

Pilots or ultralight operators interested in practical assistance for determining if their vehicles can be operated as an ultralight or as a registered aircraft will be interested in AC 103-7, "The Ultralight Vehicle." The AC answers the most often posed questions about Part 103 and provides a series of do-it-yourself charts and graphs to determine if the vehicle meets the Part 103 requirements. Free from DOT Publications Branch.

Airport Noise Planning

Airport operators interested in alleviating noise problems will be interested in AC 150/5020-1, "Noise Control and Compatibility Planning for Airports." This free bulletin contains guidance for reducing existing noise and preventing future noise by judicious planning. From DOT Publications Branch.

Where to Learn, Repair

For prospective airmen and those wishing to add a rating, send for "List of Certificated Pilot Schools." AC 140-2R may be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. Pilot, aircraft dispatcher, and flight engineer schools are listed alphabetically by state.

Also available is AC 140-7D, "FAA Certificated Maintenance Agencies Directory." This contains a listing by state of repair stations and the type of repair each performs. Purchase from GPO, address above.

GA USING MORE COMPLEX CRAFT

The latest FAA Aviation Forecast Report portrays an expanding future for aviation, although the face of general aviation will change to reflect the high technology times. The total general aviation fleet is still declining, although the turbine-powered portion is growing and is expected to continue to do so significantly. The sophistication of business jets notwithstanding, their use is expected to double in the next decade. Business use of complex multiengine piston, turboprop, and turbojet aircraft is also expected to increase. The report is available free from the Office of Aviation Policy and Plans, APO-110, 800 Independence Ave., S.W., Washington, DC, 20591; (202) 426-3103.

• CZ Cautions & Questions

Isn't the answer to the letter "When is a CZ not a CZ" a bit misleading?

While a control zone does exist even in good weather, it has no practical meaning as no restrictions are imposed on traffic in the CZ unless the weather is below basic VFR (1,000' ceiling and/or three miles visibility). Are CZ's dependent upon weather reporting capability, and if so, when the weather observer goes home and the CZ hours of operation end for the day, can the VFR pilot penetrate the existing non-operational CZ? Or must he be a certificated weather observer so he won't be in violation of some FAR?

I think the "Flight Forum" is the most interesting and informative part of most GENERAL AVIATION NEWS issues and would like to see it expanded.

Bob Simmons
Tucson, AZ

Even in VFR weather, the fact that a control zone exists should alert you to the possible presence of aircraft making IFR approaches or departures in the area. Also, control zone weather minimums are always those of controlled airspace, which are more stringent than those of uncontrolled airspace.

As for the absence of a weather observer, or the closing of a ground facility, the CZ still exists as per its regulatory established times, as indicated on sectional charts and facility directories. In the absence of local information, weather for IFR flights may be obtained from nearby reporting sites through air traffic, but the instrument approach is penalized somewhat, e.g., the DH or MDA is increased by so many feet per mile from the altimeter reporting site. For VFR flights once the facility is closed for the day, it is up to the pilot to maintain VFR conditions in the CZ.

On expanding the "Forum," that would require a larger volume of thoughtful letters like yours.

• Praise Be!

From June 17 to July 3, 1983, I flew my Cherokee Six (N3436W) with my wife and two daughters (aged 11 and 15) on a 5100-mile vacation. Let me say first that it was, in the words of the girls, "A blast!" I filed IFR on all 14 legs and enjoyed the finest air traffic service any pilot could ask for. All FSS's handled my flight plans timely and correctly and gave very accurate weather briefings and good airport advisory service. Ground control, towers, and RAPCONs did outstanding work all across this land.

My family and I want to express real thanks to all the FAA specialists for making our vacation flying "a piece of cake." I have flown a lot in the Air Force, which is easier in "hard" IFR, but this trip was a charm. Thanks, guys and gals!

Maj. Roger D. Tarr
(USAF-Ret.)
and family
Spokane, WA

• Clear Picture

Your article entitled "Icicle Weather" raised an interesting point with the photograph on p. 9 of a windshield iced up. It does not say whether the ice is on the outside or inside. Consider the following:

A fully loaded twin-engine aircraft with an electrical system that relies on one set of batteries and one ground connection is flying VFR in the mountains but with a great deal of load on the electrical system. For whatever reason, the system gives out; there is no backup. The pilots are trying to sort things out when they notice the windshield is icing up—on the inside. The "clear vision window" (openable) is on the side and virtually useless for flying and navigating visually among the mountains. What to do?

FAR Part 25.773 requires that the openable windows give both pilots a view along the normal flight path. FAR Part 23.773 omits this vital requirement, and I'm interested in why.

Norman Birch
Rancho Palos Verdes, CA

The answer to both of your questions is essentially the same. Service difficulty records do not justify burdening operators of Part 23 aircraft with the same airworthiness requirements that govern large (Part 25) aircraft.

Incidentally, the picture you mentioned has ice on the outside.

• Alaskan Survival

About the letter "Pistol Packin' Pilot from Rod Slotten in the November/December 1983 "Forum"—please inform Mr. Slotten and other pilots flying in Canada and our state of Alaska that our state law requires survival firearms and ammunition, as well as other necessary survival equipment, be carried on all flights inside the state.

George A. Acosta
Fairbanks, AK

The requirement to carry firearms and ammunition (which is a state requirement, not a federal one) in survival gear for flights in Alaska has been mentioned in past articles in FAA GENERAL AVIATION NEWS, but bears repeating with the summer tourist season approaching. For a full list of survival gear requirements for flights in Alaska, check with flight service or request a copy of the FAA GENERAL AVIATION NEWS reprint "Alaskan Adventure" from your local general aviation or flight standards district office. Also note the following letter.

• Canadian Update

Since the publication of your excellent reprint "Alaskan Adventure," some further changes have taken place in Canadian flight procedures. The corrections include:

1. *p. 3—"At or above 3,000 feet ASL" should read, "At or above 3,000 feet AGL."*
2. *map on p. 4—Kiniskan Lake is not plotted accurately. Its exact location is where the VFR routes divide, on to Atlin and Whitehorse and the other to Watson Lake.*
3. *pp. 5 and 7—Radio frequency 122.2 MHz is no longer in general use by flight service nor is it a recognized air-to-air frequency. Unless air traffic assigns something different 126.7 should be monitored during VFR flights and for FSS communications.*

Of course, all current aeronautical information publications should be consulted before any flight into or over Canada. The 1984 edition of "Flying the Alaska Highway" is not yet available, but the Air Tourist Information 1983/84 is. For a free copy write to Transport Canada, AISP/A, Ottawa, Ontario, Canada, K1A 0N8.

H. L. Townsend
Transport Canada
Vancouver, BC

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• How to Get AD's

I am interested in obtaining an itemization of all Airworthiness Directives which have been issued to date concerning a 1966 Piper Twin Comanche with an Avco Lycoming 160 hp engine.

D. C. Acker
Litchfield, NH

You could write Piper and Avco Lycoming for a listing of the pertinent AD's, or you could send for FAA's "Volume I: Summary of Airworthiness Directives—Small Aircraft." The new edition of this listing will be available in May in two books. Vol. I, Book 1 will contain all ADs prior to 1971. A one-year subscription is currently priced at $13. For AD's issued during and after 1971 a year's subscription to Vol. I, Book 2 (plus biweekly updates) now costs $84. The two books may be ordered from AAC-23, FAA Aeronautical Center, P.O. Box 25461, Oklahoma City, OK 73125.

• Subpart D and Light Aircraft

I request clarification on the following interpretation of FAR 91, Subpart D: Are 91.183(a)(1), 91.189, 91.191, and 91.209 applicable to light general aviation aircraft operations?

George E. Roberts
USAF
APO NY

Negative. Part 91 Subpart D (Large and Turbine-Powered Multiengine aircraft) does not apply to non-turbojet light general aviation aircraft. However, some organizations have successfully applied for an exemption from this exclusion.

INSTRUMENT CORNER

• Heading vs. Course

I hate to throw rocks at such an excellent source of information, but your answer to the query about the KENT TWO SID at Boeing Field was a non-answer.

First, I am unable to comprehend how "heading" means course. Second, you say to make good the runway course but only use the localizer if called for in the SID. How can a pilot on instruments determine if he is indeed following the course unless he uses the localizer? In VFR conditions, staying clear of traffic off the parallel runway is the duty of the pilot-in-comand and takes precedence over following the SID.

R. E. Gardner
Seattle, WA

Our reply was very misleading and we apologize humbly. You are right: heading does not mean course, it means heading. On any instrument departure, follow the instructions in the clearance to the letter. If you are told to fly the runway heading, fly your aircraft on the magnetic heading painted on that runway, and forget about wind correction. If you are told to fly the localizer, do that. Many thanks for your input.

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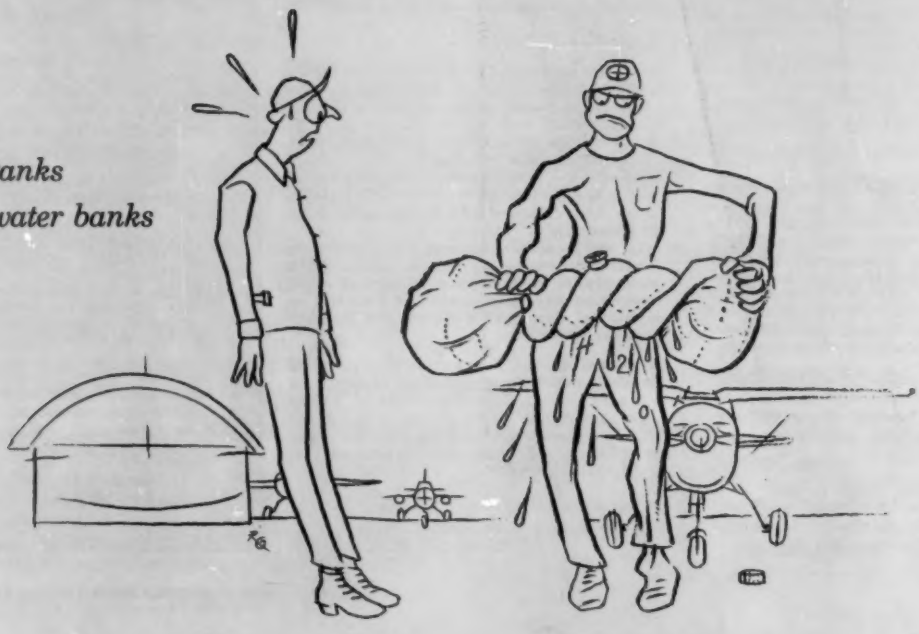
Woodrot *(continued from page 9)*

Be prepared . . . to pay. Many wooden aircraft are such a joy to fly, in terms of comfort, handling and performance, that their owners hold onto them beyond the point when economic expediency dictates otherwise. They do so by ignoring the process of deterioration that inevitably takes place, sooner or later, inside the wing. It is just not possible to seal a movable object of this kind against water penetration—especially when it is parked outside, or flown in damp weather.

Entrance is gained through microscopic cracks or pinholes in the fabric, through screw or bolt holes which have become enlarged with wear, around fittings or fairings where the seal has loosened, through unnoticed abrasions, etc. In any event the wing interior is not a vacuum, the air which must circulate through it always carries some moisture, and eventually conditions develop which are favorable to fungi activation. Unless the wings are removed and fully dissembled at reasonable intervals, some small but vital area of decay may escape notice until it results in a tragic inflight failure—often during turbulence or stressful maneuvering.

Really *thorough* maintenance of wooden aircraft is a very time-consuming and therefore expensive business. In the course of years it may amount to several times the initial acquisition price. Postponing matters by letting the plane sit idly out of annual will only compound the problem. The hard truth is that the operation of such a classic plane with maximum safety has become a luxury that is beyond the reach of most of us. ■